Citation:

Nelson M, Lowes K, Hwang V; Members of the Nutrition Group, School Meals Review Panel, Department for Education and Skills. The contribution of school meals to food consumption and nutrient intakes of young people aged 4-18 years in England. *Public Health Nutr.* 2007 Jul; 10 (7): 652-662.

PubMed ID: 17381913

Study Design:

Cross-sectional study

Class:

D - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

- To describe the contribution of school meals to daily food and nutrient intakes and to compare findings from 1997, with data collected from 2004 to 2005 in English primary and secondary schools
- To assess whether proposed recommendations regarding nutrient content of school meals are reasonable.

Inclusion Criteria:

Inclusion criteria were not explicitly stated

- Ages four to 18 years old
- Enrolled in primary or secondary school in England.

Exclusion Criteria:

- Age younger than four or older than 18 years
- Children who were not enrolled or attending primary or secondary schools
- Those who reported that they were “dieting to lose weight”
- Those who reported being “unwell with eating affected.”

Description of Study Protocol:

Recruitment

Not explicitly stated for 1997 data.

Design

Cross-sectional study.

Dietary Intake/Dietary Assessment Methodology

- Seven-day weighted food consumption survey (mentioned in abstract, but not described or discussed in body of paper)
- Information regarding dietary intake of energy and nutrients (i.e., school meal days, packed lunch days and other days) and overall health (including not unwell, unwell eating not affected and unwell and eating affected; this latter group was not included).

Statistical Analysis

No statistical tests or description of statistical analysis were given. P-values reported for only three items:

- Free school meals vs. no free school meals
- Energy and all nutrients in primary schools
- Energy and all nutrients (except vitamin A) in secondary schools

Data were presented with mean and standard deviations (SD) (in some cases as percentages and standard errors), and were presented as tables and in some cases bar graphs.

Data Collection Summary:

Timing of Measurements

One-time data collection.

Key Study Variables

- Food choices incuding:
    - All sources
    - At school
    - Outside school
- Energy and Nutrient intake including:
    - Energy (kcal and kJ)
    - Protein (g)
    - Fat (g)
    - Saturated Fatty Acids (SFA) (g)
    - Monounsaturated Fatty Acids (MUFA) (g)
    - Polyunsaturated Fatty Acids (PUFA) (g)
    - Carbohydrates (g)
    - Non-starch polysaccharides (g)
    - Sodium (mg)
    - Calcium (mg)
    - Iron (mg)
    - Zinc (mg)

- Vitamin A (ug)
- Vitamin C (mg)
- Folate (ug).

Description of Actual Data Sample:

- *Initial N:* 1,456 including
  - 750 males (390 in primary school and 360 in secondary school)
  - 706 females (353 in primary school and 353 in secondary school)
- *Attrition (final N):* 1,456 (one-time data collection)
- *Age:* Four to 18 years
- *Location:* England, UK (National survey).

Summary of Results:

Mean intakes of energy and nutrients for 1,456 pupils attending primary and secondary schools in the UK (1997) was as follows:

- Intakes of energy, zinc and non-starch polysaccharides (NSP) were below the DRV [Estimated Average Requirement (EAR) for energy and Reference Nutrient Intake (RNI) for nutrients] in both primary- and secondary-school children of both sexes. Average intakes of sodium were well in excess of the RNI in all groups
- Boys and girls in secondary schools had mean calcium intakes at 85% of the RNI, and girls in secondary schools had mean iron and vitamin A intakes below the RNI
- The percentage contributions of saturated fatty acids and non-milk extrinsic sugars (NMES) to total energy intake were well above the 11% recommended
- Nutrient intakes of pupils who did not have breakfast were significantly lower than of those who did have breakfast, whether or not cereal was included (data was not available)
- Sixty-two percent of pupils reported having breakfast with cereal, 29% had breakfast without cereal, and overall 9% had no breakfast
- The percentage not reporting breakfast was lowest in primary-school boys (4%) and girls (5%), and the highest was in secondary-school boys (9%) and girls (25%)
- Nutrient intakes of pupils who did not have breakfast were significantly lower than of those who did have breakfast, whether or not cereal was included (data was not available).

Author Conclusion:

The authors conclude that:

- School meals need substantial improvement to meet the Caroline Walker Trust (CWT) guidelines for healthy eating
- The introduction of food-based guidelines for school meals in England in 2001 did not improve the food choices in school meals.

Reviewer Comments:

- *No discussion of statistical analysis, power calculation, statistical tests, P-values, etc. Only descriptive statistics were presented*

- *There was an overall lack of detail in this paper (i.e., abstract states that a "seven-day weighted inventory" was used, but there is no detailed Methods section).*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes

3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	Yes
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	No
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A

6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	N/A
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	N/A
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes

8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes